

REMARKS

Claims 1-5 and 7-19 are currently pending. In the final Office Action dated December 28, 2007, the Examiner made the following disposition:

- A) Rejected claims 1-5, 7-11, 13-16, and 18-20 under 35 U.S.C. §103(a) as being unpatentable over *Kawakami* in view of *Fujita* and *Iwamoto*.
- B) Rejected claim 12 under 35 U.S.C. §103(a) as being unpatentable over *Kawakami* in view of *Fujita* and *Iwamoto* as applied to claim 1, further in view of *Morigaki*.
- C) Rejected claim 17 under 35 U.S.C. §103(a) as being unpatentable over *Kawakami* in view of *Fujita* and *Iwamoto* as applied to claim 1, further in view of *Yoshioka*.

Applicants respectfully traverse the rejections and address the Examiner's disposition below.

- A) Rejection of claims 1-5, 7-11, 13-16, and 18-20 under 35 U.S.C. §103(a) as being unpatentable over *Kawakami* in view of *Fujita* and *Iwamoto*:

Applicants respectfully disagree with the rejection.

Independent claim 1 recites a battery comprising a cathode, an anode, and an electrolyte. The capacity of the anode includes both of a capacity component obtained by insertion and extraction of a light metal and a capacity component obtained by deposition and dissolution of the light metal. The electrolyte contains a light metal salt having a M-O bond wherein M represents any of boron (B), phosphorus (P), aluminum (Al), gallium (Ga), indium (In), thallium (Tl), arsenic (As), antimony (Sb) or bismuth (Bi). The light metal is deposited on the anode at an open circuit voltage lower than overcharge voltage. A ratio X/Y is at least 0.05 to at most 3.0, X being the capacity component obtained by deposition and dissolution of the light metal and Y being the capacity component obtained by insertion and extraction of the light metal. The capacity of the anode obtained by insertion and extraction of the light metal is smaller than the capacity of the cathode.

The diagrams in the attached Appendix more clearly illustrate special features of the claimed invention. In particular, the "Charging 2nd Stage" diagram illustrates the

capacity of the anode obtained by insertion and extraction of the light metal (e.g. Li) being smaller than the capacity of the cathode. This diagram also quantitatively illustrates the capacity component ("X") obtained by deposition and dissolution of the light metal (e.g. Li) and the capacity component ("Y") obtained by insertion and extraction of the light metal (e.g. Li), with the ratio X/Y being at least 0.05 to at most 3.0. As further illustrated in the "Discharging 1st Stage" diagram, this ratio of X to Y results in a battery having improved cycle characteristics.

Neither *Kawakami* nor *Fujita* nor *Iwamoto*, alone or in any combination, disclose or suggest Applicants' claimed combination of an electrolyte containing a light metal salt having a M-O bond, wherein the light metal is deposited on the anode at an open circuit voltage lower than overcharge voltage, and a ratio X/Y that is at least 0.05 to at most 3.0, in which X is a capacity component obtained by deposition and dissolution of a light metal and Y is a capacity component obtained by insertion and extraction of the light metal. Furthermore, none of these references, alone or in any combination, disclose or suggest a capacity of an anode obtained by insertion and extraction of light metal being smaller than the capacity of a cathode. This subject matter is simply not discussed or suggested by *Kawakami* in view of *Fujita* and *Iwamoto*.

For at least these reasons, *Kawakami* in view of *Fujita* and *Iwamoto* fails to disclose or suggest claim 1.

Claims 4-5, 7-11, 13-16, and 18-20 depend directly or indirectly from claim 1 and are therefore allowable for at least the same reasons that claim 1 is allowable.

Applicants respectfully submit the rejection has been overcome and request that it be withdrawn.

B) Rejection of claim 17 under 35 U.S.C. §103(a) as being unpatentable over *Kawakami* in view of *Fujita* and *Iwamoto* as applied to claim 1, further in view of *Morigaki*:

Applicants respectfully disagree with the rejection.

Independent claim 1 is allowable over *Kawakami* in view of *Fujita* and *Iwamoto* as discussed above. *Morigaki* also fails to disclose or suggest Applicants' claimed ratio and anode capacity relative to cathode capacity. Therefore, *Kawakami* in view of *Fujita* and *Iwamoto* further in view of *Morigaki* fails to disclose or suggest claim 1.

Applicants respectfully submit the rejection has been overcome and request that it be withdrawn.

- C) Rejection of claim 12 under 35 U.S.C. §103(a) as being unpatentable over Kawakami in view of Fujita and Iwamoto as applied to claim 1, further in view of Yoshioka:

Applicants respectfully disagree with the rejection.

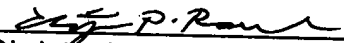
Independent claim 1 is allowable over *Kawakami* in view of *Fujita* and *Iwamoto* as discussed above. *Yoshioka* also fails to disclose or suggest Applicants' claimed ratio and anode capacity relative to cathode capacity. Therefore, *Kawakami* in view of *Fujita* and *Iwamoto* further in view of *Yoshioka* fails to disclose or suggest claim 1.

Applicants respectfully submit the rejection has been overcome and request that it be withdrawn.

Conclusion

In view of the above remarks, Applicants submit that all claims are clearly allowable over the cited prior art, and respectfully request early and favorable notification to that effect.

Respectfully submitted,

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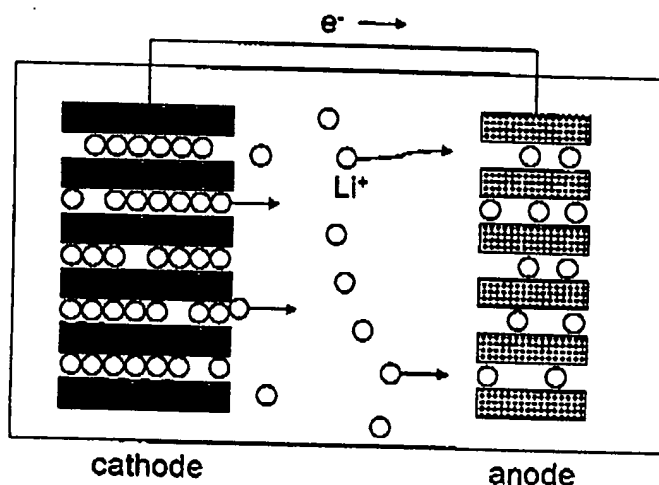
Attachment (Appendix – 4 pages)

APPENDIX

Charging 1st Stage

Li⁺ insert to anode

(Conventional Li-ion battery stage)

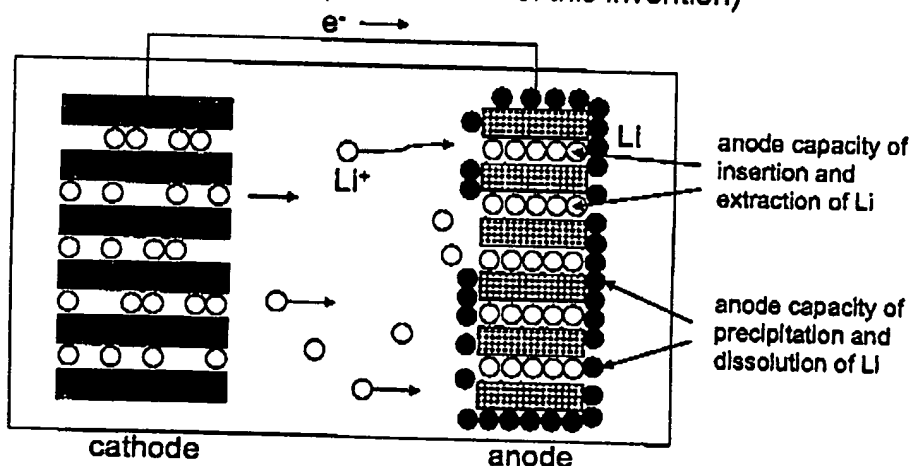


3

Charging 2nd Stage

Li precipitate (deposit) to anode

(Li on anode : special feature of this invention)



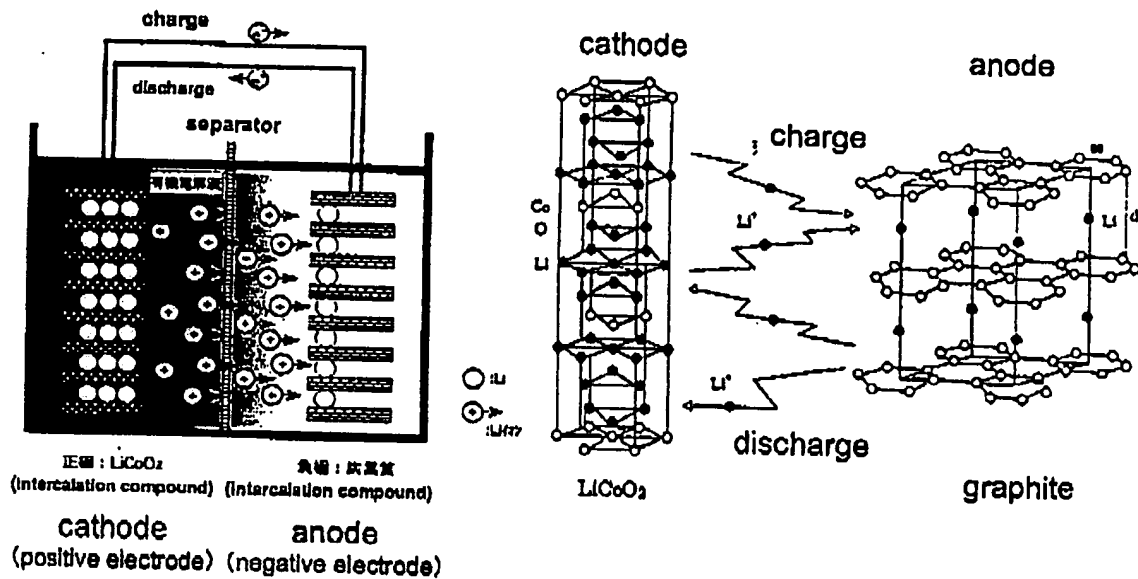
cathode capacity (insertion and extraction of Li) > anode capacity of insertion and extraction of Li

cathode capacity = anode capacity of insertion and extraction of Li and precipitation and dissolution of Li

4

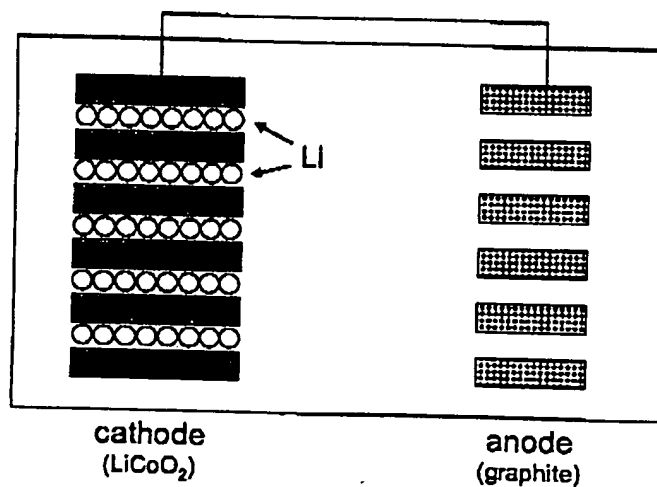
insertion/extraction of Li^+

(Conventional Li-ion battery)



1

Before Charging Stage

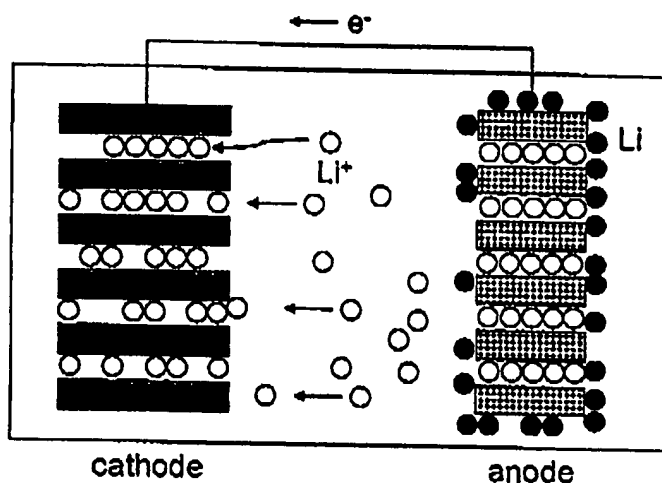


2

Discharging 1st Stage

Li dissolve from anode

(Li on anode : special feature of this invention)

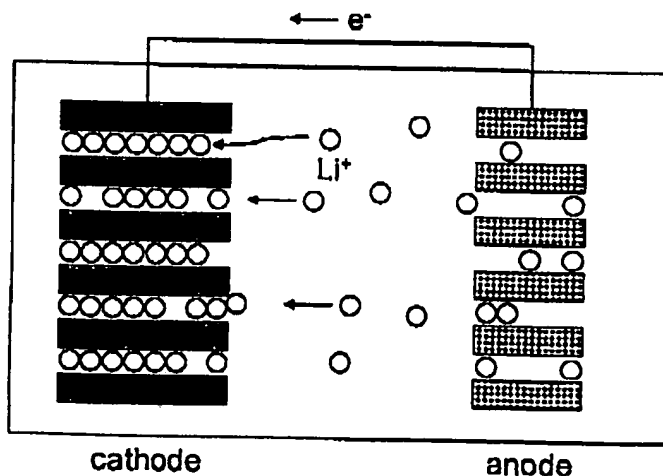


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Discharging 2nd Stage

Li⁺ extract from anode

(Conventional Li-ion battery stage)



6